OUR ASTRONOMICAL COLUMN

ASTRONOMICAL OCCURRENCES IN OCTOBER.

Oct. 6. 13h. 35m. to 14h. 29m. Moon occults κ Piscium (mag. 5).
9. 10h. 42m. Minimum of Algol (β Persei).
11. 6h. 51m. Transit (egress) of Jupiter's Sat. III.
11. 8h. 47m. to 9h. 25m. Moon occults ω^2 Tauri (mag. 4·6).
12. 7h. 30m. Minimum of Algol (β Persei).
12. 18h. 36m. to 19h. 23m. Moon occults ζ Tauri (mag. 3).
13. 15h. to 15h. 43m. Moon occults ν Geminorum (mag. 4).
15. Venus. Illuminated portion of disc = 0·637.
15. Mars. ,, ,, ,, = 0·902.
16. 17h. 26m. to 18h. 30m. Moon occults κ Cancri (mag. 5).
17. Saturn. Outer minor axis of outer ring = 16″·68.
19. 10h. Conjunction of Jupiter and Uranus. Jupiter, 0° 25′ N.
19–21. Epoch of Orionid meteoric shower. (Radiant 91°+15°.)
26. 12h. Conjunction of Jupiter and moon. Jupiter, 0° 27′ S.
28. 6h. 21m. Jupiter's Sat. IV. in conjunction S. of planet.
28. Probable date of perihelion of Barnard's comet (1884 II.).
29. 8h. 27m. to 8h. 46m. Moon occults *d* Sagittarii (mag. 4·9).
29. 16h. Mercury at greatest elongation (23° 46′ E.).

THE FIREBALL OF SUNDAY, SEPTEMBER 2, 6h. 54m.—A very large number of observations of this brilliant object were made, but they were not very exact, as the meteor appeared in daylight. The radiant point was probably in Cepheus at about 334°+57°. The object, during its visible flight, appears to have descended from a height of eighty-five miles over Richmond, Yorks., to twenty miles over Fleetwood, Lancs., and to have traversed a path of eighty-four miles. Another fine meteor was observed on Sunday evening, September 16, at 8h. 44m., and descriptions have come from London, Birmingham, Oxford and Llanelly. The radiant was in the southern sky between Capricornus and Piscis Australis at 324°−25°. The meteor fell from about fifty miles over Bewdley to thirty-two miles over Wigan, and had a visible course of eighty-six miles. The velocity is somewhat doubtful.

EPHEMERIS FOR OBSERVATIONS OF EROS:—

1900.		R.A. h. m. s.		Decl. ° ′ ″
Sept. 27	...	2 43 7·41	...	+43 27 2·0
28	...	43 25·24	...	43 49 43·2
29	...	43 40·01	...	44 12 20·4
30	...	43 51·63	...	44 34 52·7
Oct. 1	...	43 59·96	...	44 57 18·9
2	...	44 4·92	...	45 19 38·2
3	...	44 6·44	...	45 41 50·2
4	...	2 44 4·44	...	+46 3 53·8

The co-operative observations for determinations of parallax will commence about the beginning of October. The planet is at present in the constellation Perseus, and passes the meridian of London about 2·40 a.m.

EPHEMERIS OF COMET BORRELLY-BROOKS (1900*b*).—This comet is now rapidly becoming fainter, and the following abridgment from a complete Ephemeris furnished by Herr A. Scheller (*Astronomische Nachrichten*, Bd. 153, Nos. 3660, 3663) will doubtless suffice for observers possessed of the necessary optical power:—

Ephemeris for 12h. Berlin Mean Time.

1900.		R.A. h. m. s.		Decl. ° ′		Br.
Sept. 29	...	14 26 34	...	+69 7·7	...	0·07
Oct. 3	...	32 53	...	68 11·0	...	·06
7	...	38 55	...	67 24·5	...	·06
11	...	44 50	...	66 47·3	...	·05
15	...	50 38	...	66 18·7	...	·04
19	...	14 56 27	...	65 58·3	...	·04
23	...	15 2 16	...	65 45·6	...	·03
27	...	8 8	...	65 40·4	...	·03
31	...	15 14 2	...	+65 42·4	...	0·03

AUTOMATIC PHOTOGRAPHY OF THE CORONA.—Mention has often been previously made of Prof. C. Burckhalter's ingenious apparatus for obtaining photographs of the solar corona during an eclipse, and it now appears that he was extremely successful at the eclipse in May last. *Popular Astronomy*, vol. viii., contains reproductions from two negatives of the corona secured by him, one uncontrolled as has hitherto been usual, the other the result of intercepting part of the coronal light for varying periods of time during the total exposure. The total exposure in each case was 8·0 seconds, but by means of a system of revolving diaphragms arranged in one of the cameras, the image was shielded in various regions for different times, thus permitting the details of the inner corona to be photographed on the same plate as the outermost faint streamers. The following are the calculated effective exposures at the several stated distances from the moon's centre (moon's semi-diameter = 15′ 58″).

Distance from moon's centre	16′	20′	32′	50′	110
Exposure	0·04s.	0·23s.	1·76s.	3·20s.	8·00s.

The photograph shows the inner coronal detail close to the limb of the moon, the outer streamers extending for more than a lunar diameter. Several of the inner coronal tufts appear to be projected on the long broader streamers as background.

THE IRON AND STEEL INSTITUTE.

THE Iron and Steel Institute held its autumn meeting in Paris on September 18 and 19, under the presidency of Sir William Roberts-Austen, K.C.B., F.R.S. Besides a long programme of ten papers, visits to the Exhibition, to the works at St. Chamond, at Hayange in Lorraine, and at St. Denis near Paris, were arranged by an influential reception committee, of which Mr. Robert de Wendel was president and Mr. Henri Vastin honorary secretary. The attendance was unusually large, and the meeting was in every respect a successful one. The proceedings began on September 18 at the house of the Société d'Encouragement, with an address of welcome by Mr. Robert de Wendel, president of the French Association of Iron-masters. Sir William Roberts-Austen, having acknowledged the welcome, delivered a presidential address dealing in faultless literary style with the history of metallurgy in France.

The first paper read by the secretary, Mr. Bennett Brough, was by Mr. H. Pinget, secretary of the Comité des Forges, and dealt with the development of the iron industry in France since the Institute's last visit to Paris in 1889. The increase in output of iron and steel has been much greater than it was in the interval between the two previous exhibitions in Paris. No striking technical invention has been made, but great progress has been effected in increasing the power of the appliances used and in improving the quality of the products. There is a marked tendency to replace cast iron by cast steel, and success has attended endeavours to cast complicated forms in metal which is both tough and of high tensile strength. Moreover, special steels are now available for the requirements of particular applications, such as the growing exigencies of armour plate. The discussion on this paper was confined to complimentary remarks from Sir Lowthian Bell, F.R.S., Mr. Greiner and others.

The second paper, the most important submitted to the meeting, was that by Mr. J. E. Stead on iron and phosphorus. It is typical of modern metallurgical research, and contains a mass of original observations showing how phosphorus occurs in iron and steel. The subject is dealt with in four sections: (1) the constitution, properties and microstructure of iron containing form traces to 24 per cent. of phosphorus; (2) the effect of carbon when introduced by the fusion or cementation process into iron containing phosphorus; (3) the microstructure of pig iron containing phosphorus; and (4) the diffusion of solid phosphide of iron into iron. There are appended to the paper useful notes on eutectics, on solid solutions, on the method of determining free phosphide of iron in iron and steel, and on heat-tinting metal sections for microscopic examination. The observations recorded show that iron will retain as much as 1·75 per cent. of phosphorus as phosphide in solid solution, and that when more than that is present, the excess separates and is found as free phosphide of iron mixed up with the mass of iron. It is also shown that carbon added to solid solutions of phosphorus in iron throws out of solution the dissolved phosphide, which appears in a separate state. The most remarkable